DOCUMENT RESUME

ED 139 011 CS 203 407

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TITLE What Does It Take to Understand a Metaphor?
PUB DATE Mar 77
NOTE 13p.; Paper presented at a Symposium on Metaphor and Analogy, the Society for Research in Child Development (New Orleans, Louisiana, March 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Child Development; *Cognitive Processes; *Comprehension; Developmental Stages; Elementary Secondary Education; *Language Development; *Metaphors; *Psychological Studies

ABSTRACT

This paper discusses the kind of knowledge and strategies necessary to understand a metaphor. Studies of six year olds indicate that they fail to recognize that metaphors are intended nonliterally. At about the age of ten, children begin to give appropriate explanations. Children on the verge of metaphoric understanding of metaphors which link psychological and physical states show a mastery of the concept of making a link between the physical and the psychological and grasp the broad polarities of each domain, but make imprecise connections between them. Hypothesizing that the ability to articulate the underlying "core meaning" of a word was a necessary condition for correct paraphrase of a metaphoric sentence using the word, a further study showed instead that comprehension of metaphor does not require knowledge of core meanings of the key words. As an alternate explanation, it is suggested that children's understanding of metaphor is a reflection of (1) their knowledge of the real world and (2) their capacity to think analogically. (AA)

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What does it take to understand a metaphor?

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Paper delivered at a Symposium on Metaphor and Analogy,

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New Orleans, Louisiana, March 1977

The research reported in this paper was supported in part by the National Institute of Education (G-00-3-0169) and by the Spencer Foundation. We thank Patricia Weiss for her help in planning these studies.

CS203407

What does it take to understand a metaphor?

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What kind of knowledge and strategies are necessary in order to understand a metaphor? To put this question into context, I will briefly summarize a study that we conducted on the kinds of misconceptions children have about simple metaphoric language (Winner, Rosenstiel, and Gardner, 1976). Some of the questions raised by that study will then be articulated, and certain preliminary findings that have emerged from follow-up work on these issues will be reported.

Initially we were interested in how children interpret the kind of metaphoric language found in everyday speech as well as in children's literature. We wondered, for example, how children come to understand that a "hard heart" refers not to any physical quality of hardness, but rather to a psychological quality. Or how children arrive at the understanding that a "loud color" refers to a visual, not an auditory property.

In order to learn how children understand, or misunderstand, such simple expressions, we asked children ranging in age from six to fourteen to paraphrase a series of metaphoric sentences. These sentences were of two types. In half, something about a person's psychological nature was conveyed by likening that person to a physical object. For example:

> After many years of working at the jail, the prison guard had become a hard rock that could not be moved.

We called this type of sentence a psychological-physical metaphor. The other half of the items consisted of cross-sensory metaphors, in which an element from one sensory modality was described synesthetically in

terms of another modality. For example:

The color of her fingernail polish was a loud splash.

Here, color is described in auditory terms. These two types of metaphors were chosen both because they are quite frequent and because they seem to be common across many languages (Asch, 1955; Williams, 1976). In order to have confidence in what was causing correct or incorrect responses, we deliberately presented these sentences in isolation, rather than embedding them in a story context where other ancillary factors may give away the meaning. We found that children had a great deal of difficulty making sense of such expressions. Moreover, children of different ages exhibited certain systematic misunderstandings. In view of the fact that both types of metaphors used yielded similar results, we will focus here on the responses given to the psychological-physical ones.

Six-year-olds often failed to recognize that the metaphors were intended nonliterally. They accepted the sentences at face value, inventing a pretend world in which the laws of the natural world did not apply. Thus, when asked to paraphrase the sentence in which a prison guard is equated with a hard rock, they said that a king had come and turned the guard into a rock. A second strategy used by the youngest children was to alter the relation between the two elements of the metaphor: the relationship of identity--person equals rock--was changed to one of contiguity--person is associated with rock. Thus, the sentence was said to mean that the guard worked in a prison that had hard rock walls.

Eight-year-olds often realized that this sentence meant that the

prison guard was in some sense like a rock. However, they were unable to express a link between domains as distant as the psychological and the physical realms. Instead, subjects interpreted both terms of the metaphor as belonging to the physical domain. Thus, the guard had muscles that were hard like a rock.

It was not until the age of ten that children were able to appreciate the ways in which the dual-function term hard could be applied to both the psychological and the physical elements of the metaphor. At this age, consequently, they were capable of successfully paraphrasing the figure: The guard did not care about the prisoners.

While this initial investigation illuminated the general developmental trajectory of metaphoric understanding, it also raised a major question. Specifically, what is it that prohibits children under ten from understanding a simple metaphoric sentence? What kind of sensitivity to the denotations and connotations of words are necessary in order to "get it right?"

One approach we have taken to answer these questions was to re-examine some of the responses given in our study of metaphoric understanding (Winner et al., 1976). We had noted that, as appropriate explications became more frequent, (around the age of ten) they were accompanied by a kind of interpretation that was almost, but not quite, correct. We called these responses inappropriate-metaphoric. An analysis of these near-misses proved helpful in illuminating the kind of sensitivity that may be involved in apprehending a metaphor.

What did these inappropriate-metaphoric explications tell us? They revealed, first of all, that the child on the verge of metaphoric under-

standing grasped that the physical term--in this case, a rock--was a comment about a psychological property. They also revealed a sensitivity to the positive or negative polarity expressed by the metaphor. What these children failed to pinpoint was the precise psychological property to which the metaphor alluded.

Consider one of the test items:

My sister was a tightly sealed envelope.

The oldest children all agreed that this referred to someone who kept everything to herself. However, children who offered inappropriate-metaphoric interpretations thought this sentence had something to do with someone who was "bad," or with someone who was "fussy about things." And, in response to the prison guard metaphor, while the oldest children agreed that the guard was "unfeeling" and "didn't care about the prisoners," children who gave inappropriate-metaphoric interpretations thought that the guard was "angry."

Although these responses failed to zero in on the precise psychological dimension, in most cases they revealed an awareness of the positive or negative polarity expressed by the metaphoric comparison. (Hence, no child at this stage said that the prison guard was kind, or funny, for example.) In brief, the children had control over the positive or negative connotations of the metaphor before they could alight on the precise psychological property implied. That an incorrect but kindred property was chosen suggests that these children had not yet learned how to precisely map the dimensions of one domain onto those of another. This finding is reminiscent of recent research demonstrating that in under-

standing relational and dimensional adjectives, children grasp the polarity before the dimension, thus confusing tall with wide, but not with short (Bartlett, 1976; Carey, 1975; Glucksberg, 1975).

We have suggested that the comprehension of psychological-physical metaphors involves a two-part process: first the child masters the concept of making a link between the physical and the psychological, grasps the broad polarities of each domain, but makes imprecise connections between them. Later, the child succeeds at making these donnections precise. But what is it that enables the child to achieve precision?

We reasoned that perhaps the child must first acquire what has been called the core meaning of a word. Let me make clear what I mean by core meaning, by offering an example. The familiar expression "a coat of paint" is based on a general core meaning of the word coat--something that covers. A novel expression such as "a coat of sadness" is also based on this underlying general core meaning of covering. We thought it possible that what enables the child to zero in on a precise metaphoric interpretation is a knowledge of core meanings and an ability to reason by extension from that central and general meaning.

This hypothesis grew out of research that has been conducted to investigate adult knowledge of word meaning (Caramazza, Grober, and Zurif, 1976). Individual words are, to greater and lesser extents, polysemous--that is, they each have at least several different senses. Given a series of sentences, each of which exploits a different meaning of a particular word, adults are able to supply a core meaning that underlies all of the various senses of that word (Caramazza et al., 1976). Consider

the word line: the expressions, a battle line, a line of rope, and a line of people all share the core meaning extension. It has been claimed that we understand these and all novel uses of a word by analogy from a nucleus meaning that is both general and vague. If this is true, then it is our knowledge of the core meaning of the word coat that allows us to understand what it means to say a coat of mud, a coat of sadness, or a coat of anything.

We recently carried out a pilot study in order to answer the following questions.

--Is it necessary to have acquired the core meaning of a word before a novel extension of that word can be precisely understood?

--And is it possible that lack of a core meaning prohibits a child from understanding a metaphoric usage of that word?

We probed six-, eight -, and eleven-year-olds' awareness of the core meanings of various words, as well as their comprehension of metaphors based on these core meanings. All children were first given a multiple choice test designed to tap a passive knowledge of core meanings. A word was read aloud, and children were asked to select the best and most complete meaning from four orally-presented choices. The choices for the word coat were: an appropriate general core meaning--"something that covers"; an appropriate but specific meaning--"something you wear"; an inappropriate general meaning--"something that grows"; and an inappropriate specific meaning--"something you write with." So that they would not have to choose between the specific and general appropriate meaning, two choices were allowed for each word.

The next task was to paraphrase sets of sentences, each of which

used a word from the multiple-choice task in increasingly novel contexts. In order to tap a more active knowledge of core meanings than the multiple-choice tasks would allow, we also probed the children's ability to articulate the core meaning that underlay the different uses of the same word. For example, they were first asked to paraphrase a sentence employing the word coat in its most literal sense:

He put on his winter coat.

They then heard a sentence using the word in a frozen metaphoric manner:

They put a coat of paint on the house.

(This meaning was deemed frozen because while it was once a fresh metaphor, the expression has now become an established part of the lexicon.) Those children who proved able to paraphrase these two sentences were then posed the following question:

> In the first sentence you said that a coat was something you wear, and in the second sentence you said that a coat of paint meant paint on a house. Why do we use the word coat in both sentences? Why do we say a coat of paint?

Finally, the children were asked to paraphrase a sentence using the word coat as a novel, unfamiliar metaphor that they presumably had not heard before:

Each little pebble we found had a green coat on it.

(A possible interpretation of the word coat here is "moss," and indeed this is the interpretation that most adults supply.)

We hypothesized that demonstration of the ability to articulate the underlying core meaning, or success on the multiple-choice task, were necessary (though perhaps not sufficient) conditions for correctly paraphrasing the metaphoric sentences.

We found that literal sentences were understood before frozen ones, and frozen sentences before novel ones. However, counter to our expectations, the ability to articulate a core meaning was the last skill to develop. Six- and eight-year-olds proved incapable of articulating the core, and thought the same word had two entirely different meanings in each sentence. When asked to explain the presence of the word coat in "a coat of paint," one six-year-old expressed the general feeling of his age group in the following manner:

> "Well, I guess that's all the words we have. We used them all up so we have to name some things the same. I mean, when God made the words, he thought of so many he couldn't think of anymore so we have to use the same word."

It was only the eleven-year-olds who proved at all able to verbalize core meanings, and even they could do so only inconsistently. Such a task seems to call upon a rather sophisticated metalinguistic capacity to reflect on the meanings of words.

Turning to the multiple-choice results, we found that by the age of eleven, children could consistently point to the core meaning. Surprisingly, however, success on the novel metaphoric paraphrase did not predict success on the multiple-choice task. We found that for each item, some children succeeded at both tasks, some at neither, and some on just one. If a child only succeeded on one of the tasks, it was more often the case that the metaphor was successfully paraphrased while the multiple-choice task was failed. That is, they tended to pick the specific meaning and when asked to choose a second one, indicated that none was appropriate. Thus, it appears that successful comprehension of a metaphor does not, in any interesting way at least, require knowledge

of the core meanings of the key words.

Our original purpose in conducting this study was to investigate what kind of knowledge about a word is necessary in order to understand its metaphoric usage. Our results did not provide a definitive answer to this question, but they did tell us what kind of knowledge may be unnecessary. We are left with the problem of how to account for the comprehension of novel metaphors.

Having narrowed down the possible accounts of how metaphoric comprehension takes place, some speculations will be offered about the process that may be involved. While our studies do not provide a direct answer, they suggest an approach to this question. Specifically, it may be that children's understanding is a reflection of two factors: 1) their knowledge of the real world; and 2) their capacity to think analogically.

Consider the example of the coat/moss figure. We have already seen that it is unlikely that children rely on the core meaning of the word coat. What may instead be going on is the following: children know the literal meaning of the word coat. This provides one leg of the analogy: "coat is to person." They then attempt to construct the remaining term: "blank is to rock." At this point, their knowledge of the real world becomes crucial. Scanning memory, imagery, etc., they make the best estimate of what, for a rock, might function as a coat. If their real world knowledge is adequate, there is a high probability that they will select the correct interpretation of the metaphor.

Two corollaries follow from this view. First, the more context that is provided (pictorial, linguistic, etc.), the greater the likelihood that

children will alight on the correct interpretation. Second, a similar line of reasoning proves applicable to the psychological-physical metaphors. Once children become aware of the permissability of the psychological-physical connection, their capacity to render the correct interpretation will similarly call upon their capacity to think analogically, and on their real world knowledge, supplemented as far as possible by contextual cues. Thus, in the instance in which a person is compared to a sealed envelope, once children appreciate the possibility of a psychological-physical connection, their success will depend both on their ability to complete the analogy (envelope is to tightly sealed as person is to "secretive") and, more generally, on their real world knowledge.

If this account is substantiated, it will have two interesting and not entirely expected consequences. First, appropriate to the spirit of this symposium, the appreciation of metaphor will turn out to be integrally related to the capacity to engage in analogic thought. And second, the capacity to appreciate a metaphor, which is ordinarily considered to be merely an aesthetic artifice, will turn out to rest on a strong foundation of real world knowledge.

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